IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Astrom, et al.	Art Unit	: 2624
Serial No.	: 10/774,948	Examiner	: Tsung Yin Tsai
Filed	: February 10, 2004	Conf. No.	: 8639

Title : METHOD AND ARRANGEMENT IN A MEASURING SYSTEM

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BRIEF ON APPEAL

This Appeal Brief perfects the Notice of Appeal filed on November 17, 2010.

(1) Real Party in Interest

SICK IVP AB, the assignee of this application, is the real party of interest.

(2) Related Appeals and Interferences

Applicant is not aware of any related appeals or interferences.

(3) Status of Claims

Independent claims 17 and 28, and dependent claims 18-27 and 29-38 are pending in this application and stand rejected in the final office action dated August 30, 2010. Claims 1-16 have been cancelled. The rejections of claims 17-38 (all of the rejected claims) are being appealed herein.

(4) Status of Amendments

No amendments have been made after the final office action.

(5) Summary of Claimed Subject Matter

Claims 17 and 28 are independent claims and will be addressed in order.

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Independent claim 17 is directed to a method for determining imaging characteristics of an object. *See, e.g.,* Spec. page 1, lines 12-21 and page 5, lines 6-12.

The method comprises casting incident light in a linear shape from one light source onto a specific location on an object. *See, e.g.,* linear light source 2 (FIG. 1); Spec. 5:14-19.

The method comprises capturing detected light with one image sensor while casting the incident light, the detected light including at least (i) light from reflection of the incident light, and (ii) light from scattering of the incident light. *See, e.g.,* camera 1 (FIG. 1); Spec. 5:14-19.

The method comprises generating a record associated with the specific location from the detected light, the record including at least (i) first information about the reflection of the incident light, and (ii) second information about the scattering of the incident light. *See, e.g.,* images 5 and 7, record 9 (FIGS. 1-8); edge areas A, middle area B, positions 13 and 14 (FIG. 6); Spec. 7:14—8:13.

The method comprises determining an object profile for the specific location and an object scattering property for the specific location by reading the first and second information in the record associated with the specific location. *See, e.g.,* Spec. 3:25—4:2; 5:6-12.

Independent claim 28 is directed to a system. *See, e.g.,* FIG. 1; Spec. 5:6-23.

The system comprises one light source casting incident light in a linear shape onto a specific location on an object. *See, e.g.,* linear light source 2 (FIG. 1); Spec. 5:14-19.

The system comprises one image sensor capturing detected light while the incident light is being cast, the detected light including at least (i) light from reflection of the incident light, and (ii) light from scattering of the incident light. *See, e.g.,* camera 1 (FIG. 1); Spec. 5:14-19.

The system comprises an image-processing unit generating a record associated with the specific location from the detected light, the record including at least (i) first information about the reflection of the incident light, and (ii) second information about the scattering of the incident light. *See, e.g.,* images 5 and 7, record 9 (FIGS. 1-8); edge areas A, middle area B, positions 13 and 14 (FIG. 6); Spec. 7:14—8:13.

The image-processing unit determines an object profile for the specific location and an object scattering property for the specific location by reading the first and second information in the record associated with the specific location. *See, e.g.,* Spec. 3:25—4:2; 5:6-12.

(6) Grounds of Rejection to be Reviewed on Appeal

Whether claims 17-20, 26-31 and 37-38 are anticipated by U.S. 3,719,775 (Takashi)?

(7) Argument

The Examiner misunderstands Takashi's description of the light that is scattered by the space particles, or misinterprets the present claims, or both. Either way, the rejection is not supported and should be reversed.

The present subject matter relates to determining imaging characteristics of an object. Currently, claims 17-38 are pending, of which claims 17 (method) and 28 (system) are independent claims. Most of the claims were rejected under § 102(b) over U.S. 3,719,775 (Takashi), with the remainder of claims rejected under § 103(a) based on Takashi in view of U.S. 6,934,420 (Hsu). The Examiner's finding regarding Takashi is in error and the rejection should be reversed. For at least this reason, the rejection relying on Takashi and Hsu is also in error and should be reversed as well.

Independent method claim 17 recites that incident light is cast "onto a specific location on an object," and that detected light is captured. Particularly, the detected light includes at least "(i) light from reflection of the incident light, and (ii) light from scattering of the incident light." The claim then recites that "an object scattering property for the specific location" is determined.

Takashi describes a system by which a flying airplane scans the ground with laser light and an image of the ground is created. The Examiner takes the position that the "scattered light" mentioned in Takashi's FIG. 9 is scattered from the ground. *See* Final office action, p. 2-3. Applicants respectfully submit that the Examiner errs in this regard. The scattered light in Takashi's FIG. 9 refers to "light scattered backward by *space particles such as fine drops of mist suspended in the atmosphere.*"[1] Takashi col. 5, lines 18-21. This light in Takashi is not scattered by the ground; rather, according to Takashi the light is scattered by the space particles in the atmosphere so that it never impacts the ground. *Id.* That is, Takashi explicitly states that "it is *necessary* to separate signals reflected from the ground surface 23 from such scattered

[1] Emphasis is added unless otherwise noted.

light". Takashi col. 5, lines 28-30. Indeed, Takashi emphasizes that his described technology "enables information on both the two- and three-dimensional conditions on the ground surface to be obtained over a broad range ... *without any* harmful effect of scattered space particles ...". Takashi col. 7, lines 45-51.

Stated more specifically, Takashi's light rays that become scattered by the space particles have not been cast "onto a specific location on an object," as is required for the "incident light" of the present claim. Because Takashi's light rays that become scattered are not "incident light," Takashi also fails to teach or suggest capturing of "light from scattering *of the incident light*."

Takashi also does not determine "an object scattering property *for the specific location*" as required by the present claims. The claims define the specific location as being on the "object"—which would be the ground in Takashi. Because Takashi's light is scattered by space particles, it does not indicate any object scattering property of the ground. As such, Takashi determines no "object scattering property for the specific location" per the present claims.

Conclusion

The present claims appear to be in condition for allowance.

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Respectfully submitted,

Date: April 18, 2011

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Appendix of Claims

1-16. (Canceled)

17. A method for determining imaging characteristics of an object, the method comprising:

casting incident light in a linear shape from one light source onto a specific location on an object;

capturing detected light with one image sensor while casting the incident light, the detected light including at least (i) light from reflection of the incident light, and (ii) light from scattering of the incident light;

generating a record associated with the specific location from the detected light, the record including at least (i) first information about the reflection of the incident light, and (ii) second information about the scattering of the incident light; and

determining an object profile for the specific location and an object scattering property for the specific location by reading the first and second information in the record associated with the specific location.

18. The method of claim 17, wherein generating the record comprises forming a first image from the captured light.

19. The method of claim 17, wherein:

the light source is a laser forming a line of laser light on the object;

the first image contains a profile corresponding to the line of laser light on the object;

the object profile is determined using the profile in the first image; and

the object scattering property is determined using an intensity distribution of the profile in the first image.

20. The method of claim 19, wherein determining the object scattering property comprises:

identifying a middle area and an edge area in the intensity distribution; and

comparing an intensity in the edge area with at least an intensity in the middle area.

21. The method of claim 18, wherein generating the record further comprises processing the first image to generate a second image having a reduced data quantity compared to the first image.

22. The method of claim 21, wherein the first image includes image information distributed in rows and columns that represents at least part of the linear shape, and wherein the method further comprises:

(i) successively selecting respective subsets of the rows;

(ii) for each row in each of the subsets, determining whether the row's portion of the image information meets a criterion, and if so registering in the record any of the columns where the criterion is exceeded; and

(iii) generating a representative row for each of the subsets using the image information of the rows in the respective subset, the second image formed by the representative rows and containing a version of the linear shape of the incident light.

23. The method of claim 22, wherein generating each representative row comprises:

processing the portion of the image information of each row in the subset; and

detecting, while processing, whether a sum of added image information for any of the columns exceeds the criterion.

24. The method of claim 23, wherein the processing comprises summing the portion of the image information of each row in the subset.

25. The method of claim 23, wherein the processing comprises performing a max operation on the portion of the image information of each row in the subset.

26. The method of claim 17, wherein the object is elongate in one direction essentially perpendicular to the linear shape of the incident light.

27. The method of claim 17, wherein at least one of the light source and the object is moving while the incident light is cast and the detected light is captured.

28. A system comprising:

one light source casting incident light in a linear shape onto a specific location on an object;

one image sensor capturing detected light while the incident light is being cast, the detected light including at least (i) light from reflection of the incident light, and (ii) light from scattering of the incident light; and

an image-processing unit generating a record associated with the specific location from the detected light, the record including at least (i) first information about the reflection of the incident light, and (ii) second information about the scattering of the incident light;

wherein the image-processing unit determines an object profile for the specific location and an object scattering property for the specific location by reading the first and second information in the record associated with the specific location.

29. The system of claim 28, wherein the record comprises a first image formed from the captured light.

30. The system of claim 29, wherein:

the light source is a laser forming a line of laser light on the object;

the first image contains a profile corresponding to the line of laser light on the object;

the object profile is determined using the profile in the first image; and

the object scattering property is determined using an intensity distribution of the profile in the first image.

31. The system of claim 29, wherein the image-processing unit determines the object scattering property by:

identifying a middle area and an edge area in the intensity distribution; and

comparing an intensity in the edge area with at least an intensity in the middle area.

32. The system of claim 29, wherein the image-processing unit generates the record by processing the first image to generate a second image having a reduced data quantity compared to the first image.

33. The system of claim 32, wherein the first image includes image information distributed in rows and columns that represents at least part of the linear shape, and wherein the image-processing unit further:

(i) successively selects respective subsets of the rows;

(ii) for each row in each of the subsets, determines whether the row's portion of the image information meets a criterion, and if so registers in the record any of the columns where the criterion is exceeded; and

(iii) generates a representative row for each of the subsets using the image information of the rows in the respective subset, the second image formed by the representative rows and containing a version of the linear shape of the incident light.

34. The system of claim 33, wherein in generating each representative row the image-processing unit:

processes the portion of the image information of each row in the subset; and

detects, while processing the portion of the image information of each row in the subset, whether a sum of added image information for any of the columns exceeds the criterion.

35. The system of claim 34, wherein the image-processing unit sums the portion of the image information of each row in the subset.

36. The system of claim 34, wherein the image-processing unit performs a max operation on the portion of the image information of each row in the subset.

37. The system of claim 28, wherein the object is elongate in one direction essentially perpendicular to the linear shape of the incident light.

38. The system of claim 28, wherein at least one of the light source and the object is moving while the light source casts the incident light and the image sensor captures the detected light.

Evidence Appendix

None.

Related Proceedings Appendix

None.